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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,272	05/01/2001	Hiroshi Nishibori	206405US2	3084

22850 7590 03/21/2002

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EXAMINER

CRUZ, LOURDES C

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/21/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/845,272

Applicant(s)

NISHIBORI ET AL.

Examiner

Lourdes C. Cruz

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terasawa (US 5942797) in view of Braden et al. (US 5504372).

Terasawa discloses a power semiconductor device comprising:

- A ceramic substrate 21
- A power semiconductor element 1
- A circuit pattern 22 provided on an upper surface of the ceramic substrate on which the power semiconductor element 1 is held
- A lower pattern 23 provided entirely on a lower main surface of the ceramic substrate 21 opposite said upper main surface;
- A metal base plate 10 opposite said lower pattern; and
- A soldering layer (col. 5, lines 63+) between an entire surface of said lower pattern and said metal base plate for forming a bond therebetween

Terasawa, however, fails to specifically disclose the thickness of the ceramic substrate (Claim 1). See that Braden et al. teaches a ceramic substrate having a thickness of 1-3 mils in order to facilitate the conduction of heat from the devices. It would have been obvious at the time the invention was made to combine the teachings of Braden et al. to those of Terasawa in order to obtain substrates that facilitate heat conduction as disclosed by Braden et al.

Terasawa also fails to disclose a metal base plate made of a Copper alloy and circuit patterns made of an aluminum alloy. However, see that Braden et al. teaches aluminum and copper alloys in the formation of metallic films. It would have been obvious to combine the teachings of Braden et al. to those of Terasawa at the time the invention was made since Copper alloys and Aluminum alloys are good heat conductors.

Also see that Terasawa teaches Cu as the metal base plate. It would have been obvious to one of ordinary skill in the art to use a copper alloy instead of copper in order to obtain a more durable metal plate.

Regarding the thickness of the circuit pattern, the soldering layer and the base plate such thicknesses do not cause any critical or unexpected results to the device's operation. Rather it is merely an obvious design choice determined by routine experimentation. In *Aller*, the court stated "Where the general conditions of a claim are

disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456 105 USPQ 233,235 (CCPA 1995). Therefore, it would have been obvious at the time the invention was made, to determine workable ranges of thickness of such layers for the teachings of Terasawa in view of Braden et al. in order to facilitate heat conduction from the semiconductor devices.

Additionally, see that while wire bumps are being claimed, such wire bumps are within a solder layer and are to be incorporated within it and flattened out. The prior art discussed above, Terasawa in view of Braden et al., teaches a flattened out sole solder layer. It would be obvious to one of skill in the art to form solder bumps within a solder layer since the outcome, a sole solder layer, wouldn't be affected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lourdes C. Cruz whose telephone number is 703-306-5691. The examiner can normally be reached on M-F 10:00- 6:30.

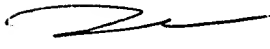
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

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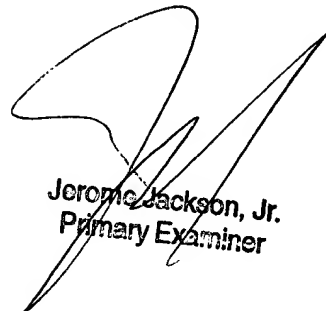
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Lourdes C. Cruz
Examiner
Art Unit 2827



Lourdes Cruz
March 19, 2002



Jerome Jackson, Jr.
Primary Examiner